ARTEMIS
Collaboration in a Rural Community Care Network

Robert R. Shank

Concurrent Engineering Research Center / West Virginia University

The ARTEMIS system was designed to meet the needs of primary care physicians and mid-level providers practicing in rural West Virginia. These requirements include aspects of both clinical information access and support for real-time and asynchronous collaboration.

The Community Care Network currently consists of four sites in southwestern West Virginia. Three of the sites are run by Valley Health Systems, Inc. (VHS), which operates clinics in underserved areas of the region. The fourth site is at Cabell Huntington Hospital (CHH), a 300-bed regional referral facility in Huntington, WV. VHS is staffed by a mix of primary care providers - family practitioners, pediatricians, internists, physician's assistants, and certified nurse practitioners. Many of the VHS providers practice at several of the clinics and all admit patients to CHH and refer to CHH specialists. Participant groups at CHH include perinatology, radiology, and the medical records and information systems groups.

Each site is equipped with Sun SPARCstation workstations and servers. Sites are linked with each other and the Internet via high speed frame relay services from the local telephone companies. Providers can access the network remotely via Integrated Services Digital Network (ISDN) or standard analog dial-up lines. Internet access is controlled through a firewall at a single site.

Experimental trials of ARTEMIS are underway in support of the prenatal practice at VHS and are being gradually expanded to support the entire patient life-cycle.

ARTEMIS consists of several components developed by project researchers as well as commercial products.

The "back end" of ARTEMIS supports unified information retrieval from multiple, distributed, heterogeneous information sources. This model-based access is built on an implementation of the Common Object Request Broker Architecture (CORBA) standard for distributed object computing. In addition to supplying the "front end" of the system, information objects can be delivered in Health Level Seven (HL7) format to any other client. Back end components include:

- an Oracle™ relational data base,
- CERC's file archival and retrieval system, and
- an Orbix™ CORBA implementation.

The "front end" of the system is based on the power of the HyperText Transfer Protocol (HTTP) and HyperText Markup Language (HTML). These technologies are at the core of the rapidly expanding World-Wide Web (WWW). This approach offers a consistent interface across platforms, including PCs, Macintoshes™, and Unix™/X-Windows workstations. Clinical information can be viewed from widely available WWW browsers such as NCSA Mosaic and Netscape™. A custom browser, WebChart, provides enhanced support for the clinical environment. In addition to their ease of use, these browsers give uniform access to information resources outside the Community Care Network. Front end components include:

- WebChart,
- Web*, a CERC-developed WWW enabler, and
- the Layout Manager, which allows users to customize the presentation of clinical information.

Wide-area collaboration and referral among providers is supported by:

- CERC's MONET desk-top conferencing system for real-time support, and
- CERC's ZEN-mail, a multi-media mail system using the Privacy Enhanced Mail (PEM) and MIME protocols.

In this presentation we will provide a technical overview of the ARTEMIS system, including both hardware and software components, and give live demonstrations of how the system is being used on a day-to-day basis. We will focus on the user interface and will include:

- charting - creating multi-media entries in the record, including integrated dictation support,
- retrieval - accessing distributed virtual records,
- referral - using ZEN-mail multi-media mail, and
- consultation - using the MONET desktop conferencing system.